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Impatiens parviflora DC. at Natural Reservation Bralce and its influence on *Waldsteinia teppneri* MÁJOVSKÝ

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Abstract: During two years (2001-2002) were studied biometrical characterisations of two species – alien invasive species *Impaties parviflora* and rare and protective *Waldsteinia teppneri* at the Natural Reservation Bralce (in district Žiar nad Hronom). In the case of *Impatiens parviflora* were noticed increasing abundance together with other characterisations. Similar situation was also with the second studyed species. None relationship was confirmed between these two species.

Keywords: *Impatiens parviflora*, *Waldsteinia teppneri*, biology of the populations.

Introduction

Impatiens parviflora DC. is according to GOJDIČOVÁ ET AL. (2002) the alien invasive species. It has occurred the Natural Reservation (NR) Bralce (in district Žiar nad Hronom) since 1979 (MAGIC in HLAVÁČEK 1985).

There were many reasons for establishing the NR and one of them was the occurrence of the rare and protected (in a sense of Ordinance of MŽP no. 24) species, namely *Waldsteinia teppneri* MÁJOVSKÝ. It is the hybrid of species *W. ternata* subsp. *magicii* x *trifolia* (DOSTÁL & ČERVENKA 1983). DOSTÁL & ČERVENKA

(1983), MAGLOCKÝ & FERÁKOVÁ (unpubl.) and ZAHRADNÍKOVÁ (1992 in BERTOVÁ (ed.) 1992) take its occurring at Bralce as unique locality in Slovakia.

This paper shows result from studying chosen biometric characterisations of both species and point out to some relationship between *Impatiens parviflora* and *Waldsteinia teppneri*. Because of the possibility of the negative influence of *Impatiens parviflora* to *Waldsteinia teppneri*.

Material and methods

There were established seven plots (1x1 m) in NR Bralce because of monitoring. Both species occurred six plots, on the seventh was only the growth with *Impatiens parviflora*.

Once a month, during the years 2001 and 2002, were found out these biometrical characterisations at the plots:

Impatiens parviflora

- the number of individuals,
- the height of individuals (from the ground, cm),
- the number of leaves,
- the area of leaves – by way of the raster method, cm^2 (DYKYJOVÁ, 1989),
- the dry weight – by drying in laboratory by temperature 105 °C to the constant weight (g).

The biomass of *Impatiens parviflora* was studied with the destructive method, namely the method of coupling individuals (DYKYJOVÁ, 1989). In the case, there were abundance of *Impatiens parviflora* less than 10 individuals, then were sampled (from nearby of a plot) the same number of individuals as there were at a plot. As long as the number was more than 10 individuals, *Impatiens parviflora* was sampled in the number of 10 individuals.

Waldsteinia teppneri

- the cover (%),
- the abundance (in year 2002),
- the height of aboveground sprout of the middle size individual (cm),
- the width and length of leaf blade of the middle size individual (cm).

Middle size individual was determined by approximation.

Analyse of the regression and correlation was done with the program STATISTICA ver. 5.

Results

During years 2001-2002, *Impatiens parviflora* was analysed once a month. Results of measures the chosen biometrical characterisations (the abundance, the height of individuals, the number of leaves, the leaf area and dry weight of leaves and stalks) are written down in the Tab. 1.

Impatiens parviflora occurred in the area of NR from May to September. Only from the seventh plot, where it has the highest abundance, *Impatiens parviflora* disappered in August.

Evidently, it has increasing abundance (Fig.1). The highest numbers were noticed in May (124 pieces, year 2001) and in the year 2002, there was 150 individuals of this alien species on all plots.

The upper-most height was noted in August and September (12,4 cm) in the year 2001, the following year it was also in August (17,23 cm). The greatest average number of leaves per plant was noticed in the year 2001 in August, namely eight leaves per individual. In the year 2002, this characterisation had a value of 11 leaves per plant in July. In the second year of research was noticed the maximum value of the leaf area, namely 4.229,05 cm^2.

Results of measures the chosen biometrical characterisations of *Waldsteinia teppneri* (the cover and the number of individuals, the height of aboveground sprout of the middle size individual, the width and length of leaf blade of the middle size individual) are indicated in the Tab.2

Waldstienia teppneri is evergreen species, which is able to renewal in various season besides winter. The youngest sprouts have the almost same height in comparison with the adults but their leaf blade is developed later. So, smaller average dimensions of leaves indicated the renewal of *Waldsteinia teppneri*.

The smallest width of leaf blade was noted in April 2002 (3,22 cm), alike the length of the leaf blade (2,33 cm). On the other hand, the highest values were achieved in June 2002 (the width of the leaf blade 5,23 cm and the length 4,68 cm). These values present the maximum dimensions which were written down during years 2001-2002.

The cover of *Waldsteinia teppneri* was higher in the year 2002 than the previous year or remained on the same level. Cover changes during vegetation seasons were caused by renewal, natural die-back and influence of the disturbance by tourists and pickers of forest fruits.

Cover increasing made 10-25 % between the year 2001 and 2002. Changes during the year were maximum 25 %. Smaller values were noticed because many individuals were cover with L-layer in spring. Realistic difference within one year was 5-10%.

The relationship between the number of individuals *Impatiens parviflora* and the number of the aboveground sprouts of *Waldsteinia teppneri* is characterised by low value of the correlation index ($r = 0,08$) so, it is free dependence. This shows also survey of their abundance (Fig.2). Coefficient of the determination r^2 was defined on value 0,007.

Upper index values were reached by comparison of the leaf area of *Impatiens parviflora* with the number of *Walsteinia teppneri* sprouts. The correlation index got to value 0,31. The index of determination was specified on 9 %. Indexes were counted from data which were found out from June to August in the year 2002.

According to index values, there is not any statistic dependence between studied characterisations. It is important to emphasis fewer number of data what could influence the results.

Conclusions

This paper presents results of research which takes two years (2001 and 2002). Its aim was obtained more detailed information about population of *Impatiens parviflora* at the Natural Reservation Bralce (in district Žiar nad Hronom). Because of the occurrence of *Waldsteinia teppneri* in the locality, it was important to find out if there would be some relationship between these two species.

Abundance of *Impatiens parviflora* had increasing tendency, alike the others characterisations. Abundance and cover of *Waldsteinia teppneri* had also increasing tend, but dimensions of aboveground sprouts and leaf blade of the middle size individual had decreasing tendency. This is more probably caused by population dynamic of *Waldsteinia teppneri* because it is perennial plant than by Impatiens parviflora. This statement confirm also results of analyse of the regression and correlation which show only small degree of dependence or free one.

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Tab. 1. Results of measures of the chosen biometrical characterisations of *Impatiens parviflora.*

Month/year	No. of individ.	Analys. sample	Height cm	No. of leaves	Leaf area cm^2	Dry weight (g) leaves	stalk
V.2001	124	52	7,62	235	775,92	1,49	0,82
VI.2001	106	41	9,12	209	1217,04	1,9	1,5
VII. 2001	73	39	11,59	245	1106,28	2,3	2,4
VIII. 2001	65	39	12,4	328	2459,02	3	2
IX. 2001	15	15	12,4	114	592,44	1,026	0,819
Minimum	**15**		**7,62**	**114**	**592,44**	**1,026**	**0,819**
Maximum	**124**		**12,4**	**328**	**2459,02**	**3**	**2,4**
Median	**73**		**11,59**	**235**	**1106,28**	**1,9**	**1,5**
Average	**76,6**		**10,63**	**226,2**	**1230,14**	**1,94**	**1,51**
St.deviation	**41,99**		**2,15**	**76,94**	**731,2**	**0,76**	**0,7**
V.2002	150	54	10,31	327	1618,59	7,83	1,004
VI.2002	122	55	15,98	473	3491,81	6,8	2,687
VII. 2002	92	49	16,92	524	4229,05	5,503	4,216
VIII. 2002	46	35	17,23	368	1908,18	2,797	3,247
IX. 2002	3	3	9,95	5	3,4	0,011	0,094
Minimum	**3**		**9,95**	**5**	**3,4**	**0,011**	**0,094**
Maximum	**150**		**17,23**	**524**	**4229,05**	**7,83**	**4,216**
Median	**92**		**15,98**	**368**	**1908,18**	**5,5**	**2,69**
Average	**82,6**		**14,08**	**339,4**	**2250,21**	**4,59**	**2,25**
St.deviation	**58,86**		**3,64**	**202,93**	**1659,93**	**3,18**	**1,68**

Tab. 2. Results of measures the chosen biometrical characterisations of *W. teppneri.*

Month/year	No. of individ.	Cover %	Aboveground sprout (cm) height	width	length
IV. 2001		15	5,38	3,74	2,68
V.2001		23	6,35	4,49	2,96
VI.2001		21	6,58	4,8	4,02
VII. 2001		18	6,77	4,9	4,08
VIII. 2001		18	6,97	4,65	4,1
IX. 2001		18	7,06	4,65	4,1
X. 2001		18	7,3	4,75	4,08
Minimum		**15**	**5,38**	**3,74**	**2,68**
Maximum		**23**	**7,3**	**4,9**	**4,1**
Median		**18**	**6,77**	**4,65**	**4,08**
Average		**18,71**	**6,63**	**4,57**	**3,72**
St.deviation		**2,56**	**0,64**	**0,39**	**0,62**
IV. 2002	96	15	6,08	3,22	2,33
V.2002	177	26	6,52	4,97	4,18
VI.2002	169	27	5,27	5,23	4,68
VII. 2002	188	28	5,6	4,32	4,13
VIII. 2002	152	26	6,02	4,93	4,23
IX. 2002	113	25	5,7	4,5	4,3
Minimum	**96**	**15**	**5,27**	**3,22**	**2,33**
Maximum	**188**	**28**	**6,52**	**5,23**	**4,68**
Median	**160,5**	**26**	**5,86**	**4,72**	**4,21**
Average	**149,17**	**24,5**	**5,87**	**4,53**	**3,98**
St.deviation	**36,93**	**4,76**	**0,44**	**0,72**	**0,83**

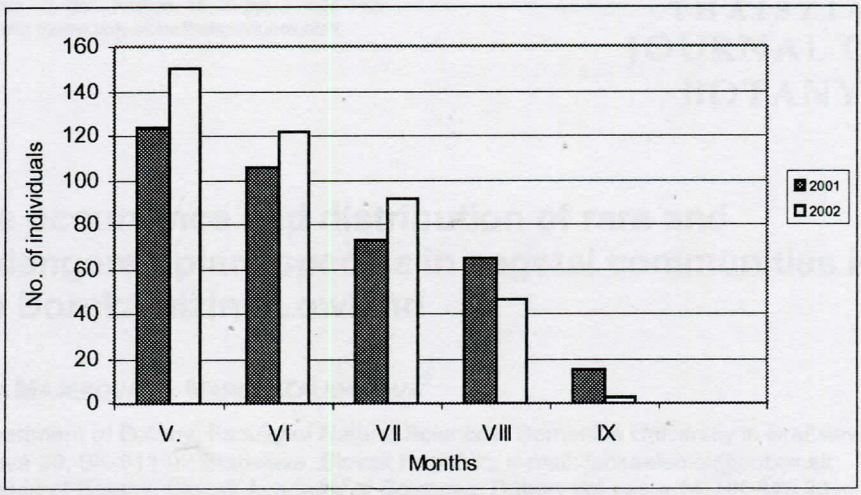

Fig. 1. Maximum abundance of *Impatiens parviflora* in individual months during years 2001-2002.

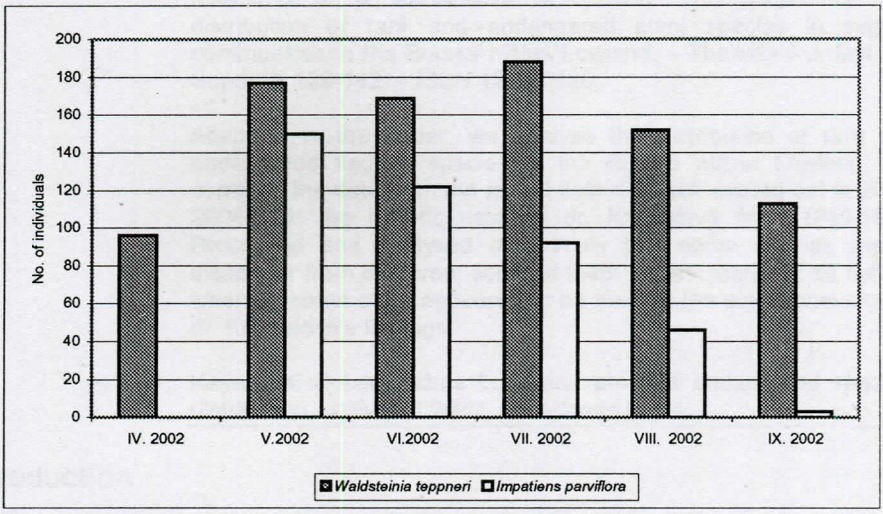

Fig. 2. Survey of the abundance of both studied species.